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LETTER TO THE EDITORS

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Reply to the letter from C. von Schnakenburg and M. Krüger

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Sirs,
We thank Drs. von Schnakenburg and Krüger for their comments. They rightfully raise the question of the safety of sodium nitroprusside administration in newborn patients and ask for details of our recently reported patient [1]. The newborn child received sodium nitroprusside for 6 days, at a maximum dosage of 4 μg/kg per min for 48 h, after she failed to respond to several boluses of intravenous hydralazine. The thiocyanate level, measured after 48 h of infusion, was normal at 8 μg/ml (toxic levels >30 μg/ml). Regularly repeated blood analysis never showed lactic acidosis or methemoglobinemia. The child had invasive blood pressure measurement during the entire period of sodium nitroprusside infusion. Blood pressure responded well to that therapy, without any hypotensive episodes.

In addition to its potent vasoactive properties, sodium nitroprusside possesses unique toxicities that Dr. von Schnakenburg et al. allude to in their comments. Sodium nitroprusside is rapidly transformed into nitric oxide (NO) and cyanate (CN^-). CN^- is then metabolized/eliminated via three routes: (1) an irreversible transformation into thiocyanate (detoxification), (2) a binding to hydroxycobalamin, to form cyancobalamin (which is eliminated via the kidney), and (3) intracellular metabolism by oxidase, which can lead to cellular asphyxia and lactic acidosis. Methemoglobinemia can also occur [2, 3, 4]. Therefore, sodium nitroprusside administration is not devoid of side effects, although they are deemed to be rare, and often associated with particular pathological conditions (renal failure, malnutrition, hepatic failure, smoking) that can predict their occurrence [2, 3, 5, 6]. Our child clearly did not show any side effects of sodium nitroprusside administration.

Emergency treatment of hypertension in the neonate remains difficult, with currently very few tested drugs available. Indeed, sodium nitroprusside has been recommended in the acute treatment of hypertensive emergencies, or in patients with refractory congestive heart failure [7, 8, 9, 10], with the recommendation of regularly checking blood gas (for the presence of methemoglobinemia and metabolic acidosis), and plasma levels of thiocyanate and lactate. Calcium channel blockers or beta-adrenoreceptor antagonists have been used successfully in the newborn to treat hypertension or various arrhythmias [11], although their use has also been associated with cardiovascular collapse, especially in the newborn [12, 13]. The cardiodepressant adverse effect of calcium channel blockers or beta-adrenoreceptor antagonists is especially pronounced in patients with pre-existing left ventricular impairment [14], as in our patient. We felt that both calcium channel blockers and beta-adrenoreceptor antagonists were contraindicated in our patient with severely depressed myocardial function.

In summary, in cases of hypertensive emergency with heart failure, sodium nitroprusside is probably a better alternative than continuous administration of calcium channel blockers and beta-adrenoreceptor antagonists, and is clearly superior to intermittent administration of antihypertensive drugs. In our experience, the use of sodium nitroprusside by incremental infusion in the critical early phase of management has resulted in improved control of hypertension without any sudden hypotensive episodes seen when bolus injections are used. Nevertheless, the comments of Dr. von Schnakenburg are welcomed: moderate to high doses (>3 μg/kg per min) of sodium nitroprusside, given for >72–96 h, are associated with significant side effects, which are potentially lethal. Children given sodium nitroprusside should be carefully followed with invasive blood pressure and regular blood gases, lactate, and thiocyanate measurements. Sodium nitroprusside administration should be decreased or stopped as soon as possible. Co-administration of thio-

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sulfate with sodium nitroprusside to prevent cyanide toxicity has been shown to be successful, but is not yet common practice [15].

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